REMARKS

Applicant has made amendments to clarify certain views in the figures at the request of the Official Draftsperson. Applicant has also amended the claims to restore a claim that was canceled by examiner amendment, to make clerical corrections in light of the examiner's amendment of claim 5, and to remove a typographic error from claim 5.

Applicant asks that all claims be allowed. Please apply any other charges or credits to deposit account 06-1050, reference 01568-010001.

Respectfully submitted,

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Version with markings to show changes made

In the claims:

5. (twice amended) A line-at-a-time electronic driving method comprising

applying a bias voltage to rows or columns of a device,

applying data voltages to the columns, in the case when the bias voltage is applied to the rows, or to the rows, in the case when the bias voltage is applied to the columns, the data voltages being applied alternately about a value of the bias voltage,

actuation of the device occurring when a difference between the values of the data voltage and a select voltage is above a first predetermined level,

release of the device occurring when the difference between the values of the data voltage and the select voltage is below a second predetermined level [lowest], and

the device maintaining its state when the select voltage is at the bias level.

In the specification:

Paragraphs beginning at page 3, line 7 have been amended as follows:

Figs. 10A – 10H [is a drawing that reveals] show the structure, fabrication, and operation of a MEMS switch.

Fig. 10[B]I illustrates [two] an alternative switch design.

Fig. 10J illustrates a second alternative switch design.

Paragraph beginning at page 3, line 28 has been amended as follows:

Figs. 20A – 20G illustrate how IMod based test structures may be used as tools for stress measurement.

Paragraph beginning at page 17, line 20 has been amended as follows:

Fabrication of the switch elements as MEMS devices make it possible to fabricate an entire display system using a single process. The switch fabrication process becomes a subprocess of the IMod fabrication process and is illustrated in Figs. 10A – 10H.

Paragraph beginning at page 17, line 22 has been amended as follows:

[Step 1 shows both a side view and top view of the initial stage.] Referring to Figs. 10A and 10B, the initial stage of the IMods fabrication process is shown, Fig. 10A. Arrow 1004 indicates the direction of the perspective of the side view. Substrate 1000 has had sacrificial spacer 1002 a silicon layer 2000 angstroms thick deposited and patterned on its surface.

Referring to Figs. 10C and 10D, the second stage of the IMods fabrication process is shown. [In step 2, a] A structural material, an aluminum alloy several microns thick, has been deposited and patterned to form source beam 1010, drain structure 1008, and gate structure 1006. Several hundred angstroms of a non-corroding metal such as gold, iridium or platinum may be plated onto the structural material at this point to maintain low contact resistance through the life of the switch. Notch 1012 has been etched in source beam 1010 to facilitate the movement of the beam in a plane parallel to that of the substrate. [The perspective of the drawing is different in steps 3 and 4, which now compare a front view with a top view.]

Referring to Figs. 10E – 10H, [a]Arrows 1016 indicate the direction of the perspective front view. [In step 3,] Referring to Figs. 10E and 10F, in the final stage of the IMod manufacturing process, the sacrificial material 1002 has been etched away leaving the source beam 1010 intact and free to move.

Paragraph beginning at page 18, line 3 has been amended as follows:

Referring to Figs. 10G and 10H, [W]when a voltage is applied between the source beam and the gate structure, the source beam 1010 is deflected towards gate 1006 until it comes into contact with the drain 1008, thereby establishing electrical contact between the source and the drain. The mode of actuation is parallel to the surface of the substrate, thus permitting a fabrication process that is compatible with the main IMod fabrication processes. This process

also requires fewer steps than those used to fabricate switches that actuate in a direction normal the substrate surface.

Paragraph beginning at page 18, line 10 has been amended as follows:

Figures 10[B]I and 10[C]J illustrate[s] two alternative designs for planar MEM switches. The switch in figure 10[B]I differs in that switch beam 1028 serves to provide contact between drain 1024 and source 1026. In the switch of figure 10[A]H, currents that must pass through the source beam to the drain may effect switching thresholds, complicating the design of circuits. This is not the case with switch 1020. The switch in figure 10[C]J reveals a further enhancement. In this case, insulator 1040 electrically isolates switch beam 1042 from contact beam 1038. This insulator may be a material such as Si02 that can be deposited and patterned using conventional techniques. Use of such a switch eliminates the need to electrically isolate switch drive voltages from logic signals in circuits comprising these switches.

Paragraph beginning at page 33, line 19 has been amended as follows:

Figures 20A [and 20B] – 20G show examples of how an IMod may be used in this fashion. Referring to Figs. 20A and 20B, IMods[,] 2000[,] and 2002[,] are shown from the perspective of the side and the bottom (i.e., viewed through the substrate). They are of a double cantilever and single cantilever form respectively. In this case, the structural material has no residual stresses, and both membranes exhibit no deformation. As viewed through the substrate, the devices exhibit a uniform color that is determined by the thickness of the spacer layer upon which they were formed. Referring to Figs. 20C and 20D, IMods 2004 and 2006 are shown with a stress gradient that is more compressive on the top than it is on the bottom. The structural membranes exhibit a deformation as a result, and the bottom view reveals the nature of the color change that would result. For example, if color region 2016 were green, then color region 2014 might be blue because it is closer to the substrate. Conversely, color region 2018 (shown on the double cantilever) might be red because it is further away. Referring to Figs. 20E and 20F, IMods 2008 and 2010 are shown in a state where the stress gradient exhibits higher tensile stress on the top than on the bottom. The structural members are deformed appropriately, and the color regions change as a result. In this case, region 2020 is red, while region 2022 is blue.

Paragraph beginning at page 34, line 3 has been amended as follows:

In figure 20[B]G, a system is shown which can be used to quickly and accurately access the residual stress state of a deposited film. Wafer 2030 comprises an array of IMod structures consisting of both single and double cantilevered membranes with varying lengths and widths. The structural membranes are fabricated from a material whose mechanical and residual stress properties are well characterized. Many materials are possible, subject to the limitations of the requisite reflectivity that can be quite low given that the IMods in this case are not to be used for display purposes. Good candidates would include materials in crystalline form (silicon, aluminum, germanium) which are or can be made compatible from a fabrication standpoint, exhibit some degree of reflectivity, and whose mechanical properties can or have been characterized to a high degree of accuracy. These "test structures" are fabricated and released so that they are freestanding. If the materials are without stress, then the structures should exhibit no color variations. Should this not be the case, however, then the color states or color maps

may be recorded by use of a high resolution imaging device 2034, which can obtain images of high magnification via optical system 2032.